

97-84242-27

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London

1889

97-84242-27

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332 Norman, John Henry.
Z11 ...The exchanges upon a scientific
basis, also the modes of effecting exchanges.
London 1889. O. 8p.
Reprinted from "Bankers' magazine"
for February, 1889. ☐ Only ed.
No. 8 of a volume of pamphlets.

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TECHNICAL MICROFORM DATA

FILM SIZE: 35mmREDUCTION RATIO: 10:1IMAGE PLACEMENT: IA ☒ IIA IB IIBDATE FILMED: 11-11-97INITIALS: BSTRACKING #: 29715

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To be pasted into "COIN OF THE REALM: What Is It?"
and to be digested by the Reader.

THE EXCHANGES UPON A SCIENTIFIC BASIS;

ALSO

THE MODES OF EFFECTING EXCHANGES.

BY

JOHN HENRY NORMAN.

Reprinted from "Bankers' Magazine" for February, 1889.

PRICE ONE PENNY.

LONDON:
WATERLOW & SONS LIMITED, PRINTERS, LONDON WALL.

1889.

THE EXCHANGES UPON A SCIENTIFIC BASIS, &c.

TENS of thousands of persons throughout the world who are in the habit of working colonial and foreign exchanges never think of definite weights of standard gold or silver indicated by the denominational expressions with which they are working. Even the chain rule, which is so widely used in effecting arbitrations of exchanges, to a large extent embraces denominational expressions for weights of gold and silver instead of the weights themselves. These rules and examples are found ready to hand, and the mind goes no further than the mechanical work to reach the correct answer. If this is the practice of merchants, bankers and exchange dealers, is there any cause for surprise that rulers, statesmen, legislators, scientists and political economists fail of having "a masterly skill in bullion and coin," and are as rudderless ships at sea in "delicate emergencies," and when most important monetary problems have to be nationally discussed and settled? Trade in countries, and between countries possessing effective standards of gold or silver, the denominational expressions for weights of which are prices and rates of exchange, is carried on in precisely the same way as when Abraham weighed his silver out in payment for his burial cave. For the effigy certifying the weight of fine metal in the standard coin ensures that weight counted out in coin as though the metal were weighed out. The receipt of any recognised token of the standard metal is as effective a discharge of debt as though the standard metal were weighed out for it. This paper will show the force of metal prices and exchanges between countries possessing effective metal standards.

The working of exchanges upon denominational expressions for weights has introduced confusion which even practical exchangers are occasionally entangled in. This is manifest in calling a rise a fall and a fall a rise, a premium a discount, and a discount a premium in exchange. For instance, in the exchange between the British Isles and India compare 1s. 10½d. with 1s. 4½d. per rupee. In the British Isles we should say the exchange with India has fallen 6d. per rupee, and it would be right. Because in the one case 10·6 grains of fine gold are given for 165 grains of fine silver, and in the other 7·8 grains

of fine gold are given for 165 grains of fine silver. But in India, speaking of the difference between the same rates, the rate would be said to have fallen, which is wrong. Because in the one case 165 grains of fine silver would command 10·6 grains of fine gold, and in the other 165 grains of fine silver would command only 7·8 grains of fine gold; showing that the Indian rate had risen in consequence of the same weight of silver commanding a less weight of gold. There never could have been any confusion if a more scientific system had been followed. We see in the present method of quotations of exchanges that between two countries, say, for instance, the British Isles and India, one expression is invariably a constant, in this case the rupee. The quotation both in the British Isles and in India is more or less pence per rupee.* The following suggestion is made as defining a scientific method and one free from obscurity and not leading to confusion. *The variable expression or weight in the country originating the transaction for the constant expression or weight in the country with which the comparison is made or upon which the bill is drawn.*

Of the quotations of the British Isles on other countries, and of other countries on the British Isles, the sixteen following are specimens of those in use. The countries having at present inconvertible paper currencies are treated as if they possessed effective metal standards.

TABLE I.
ro—Grains of Fine Gold. rs—Grains of Fine Silver.

	British Isles on.	On British Isles.
France . .	Francs <i>f</i> 25·22 or 113·0016 ro for £1 or 113·0016 ro.	<i>f</i> 25·22 or 113·0016 ro for £1 or 113·0016 ro.
Germany . .	Marks <i>m</i> 20·43 or 113·0016 ro for £1 or 113·0016 ro.	<i>m</i> 20·43 or 113·0016 ro for £1 or 113·0016 ro.
Russia . .	Pence <i>d</i> 26·21 or 12·34 ro for 1 rouble or 277·7224 rs.	<i>d</i> 26·21 or 12·34 ro for 1 rouble or 277·7224 rs.
Austria-Hungary	Florins <i>f</i> 14·83 or 2542·54 rs for £1.	<i>f</i> 14·83 or 2542·54 rs for £1.
India . . .	Pence <i>d</i> 15·56 or 7·33 ro for 1 rupee 165 rs.	<i>d</i> 15·56 or 7·33 ro for 1 rupee or 165 rs.
United States of America . .	Dollar \$ 4·86 or 113·0016 ro per £.	\$ 4·86 or 113·0016 ro per £.
Chili . . .	Pence <i>d</i> 32·87 or 15·48 ro per peso or 347·228 rs.	<i>d</i> 32·87 or 15·48 ro per peso or 347·228 rs.
Argentine Republic	Pence <i>d</i> 49·16 or 23·148 ro per peso or 23·148 ro.	<i>d</i> 49·16 or 23·148 ro per peso or 23·148 ro.

*Additional confusion in this instance arises from the statement that the par of exchange with India was 2s. per rupee. This was not so. For 2s. per rupee is the equivalent of 64·58 pence per standard ounce of silver, and between this present time and 1833 the highest yearly average price was 62½ pence in 1839. Under this term 2s., the one-tenth of a pound, or 11·30000 grains of fine gold has been lost sight of.

There is no system in these. If you start with the idea that between the British Isles and silver standard countries the quotations will be pence for the moneys of account of these countries, you find the conditions with Russia and Austria-Hungary, both professedly silver standard countries, throw you out, with Russia pence per rouble, with Austria-Hungary florins per £1. Again Chili, with a professedly silver standard, and the Argentine Republic, with a professedly gold standard, both are quoted pence per their moneys of account. A scientific system of quotations of exchanges would be the following for the sixteen quotations of the eight countries named as examples for the whole.

TABLE II.

ro—Grains of Fine Gold. rs—Grains of Fine Silver.

	British Isles on.	On British Isles.
France . .	Pence <i>d</i> 9-51 or 4-48 ro per franc or 4-48 ro.	Francs <i>f</i> 25-22 or 113-0016 ro per £1 or 113-0016 ro.
Germany . .	Pence <i>d</i> 11-75 or 5-5313 ro per mark or 5-5313 ro.	Marks <i>m</i> 20-43 or 113-0016 ro per £1.
Russia . .	Pence <i>d</i> 26-21 or 12-34 ro per rouble or 277-7224 rs.	Rouble <i>r</i> 9-15 or 2542-53 rs per £1.
Austria-Hungary	Pence <i>d</i> 16-18 or 7-62 ro per florin or 171-470 rs.	Florin <i>f</i> 14-83 or 2542-53 rs per £1.
India . .	Pence <i>d</i> 15-56 or 7-33 ro per rupee or 165 rs.	Rupee <i>r</i> 154-09 or 2542-53 rs per £1.
United States of America . .	Pence <i>d</i> 49-31 or 23-22 ro per dollar or 23-22 ro.	Dollar <i>\$</i> 4-866 or 113-0016 ro per £1.
Chili . .	Pence <i>d</i> 32-87 or 15-48 ro per peso or 347-228 rs.	Peso <i>p</i> 7-35 or 2542-53 rs per £1.
Argentine Republic	Pence <i>d</i> 49-16 or 23-148 ro per peso or 23-148 ro.	Peso <i>p</i> 4-881 or 113-0016 ro per £1.

Since it is not to be expected that there will be any alteration in quoting and working the exchanges of the world, it might serve to keep the mind free from error to be careful when quoting a rate to put the coin of the country originating the transaction first in the formula. Thus in India, instead of quoting pence per rupee, quote rupee per pence. If a rupee, or 165 grains of fine silver, is given for a less number of pence or a smaller weight of gold, the exchange in India on the British Isles has risen. If fewer pence are given in the British Isles for a rupee, the exchange in the British Isles on India has fallen.

With regard to the effect of the exchanges, let it be thoroughly grasped that every grain of wheat and oil seed,

each hank of jute and skein of silk, every pound of indigo and ounce of tea which come from India and are used in the British Isles, have silver and gold as good as weighed out against their weights more than once between the production and consumption of these commodities. Follow a spoonful of tea, with which you are about to make your afternoon cup of this refreshing beverage. The planter, who is a friend of yours, has sent it to you from his factory in Assam. He has paid silver against it to the labourer for his work and for other necessities in Assam. He has sent it to his agent in London for transmission to you. You do not know either the cost price or the sale price of the tea, and you can only tell your friend who likes it, and desires to know its price, that you think it better than some you recently bought at a first-class shop at 2s. 6d. per lb. Suppose that you have bought that spoonful of tea, and the tea planter has dealt with it in the ordinary commercial manner. He would send the tea to his agent at the seaport, with instructions to sell it there. The buyer would pay silver for it, having ascertained upon what terms *silver in India could be exchanged for gold in the British Isles*. He sends the tea to London, and sells it at auction in the Mincing Lane tea market to a tea dealer, the buyer paying gold for it. At length it comes into your possession, you having paid gold for the same. The tea might have passed through more hands than those mentioned before it came into yours, both in India and in the British Isles, but the possessor of it each time practically weighed out either silver or gold for it. It should be particularly noticed that the purchaser in India first ascertained at what rate he could exchange silver for gold, before he parted with his silver for the tea. It may be asked why he did this? he had parted with his silver and got the tea instead: he would have nothing more to do with silver in the transaction. True. *But he has bought the tea for the purpose of selling it for gold in the British Isles*. Assume that your spoonful of tea is part of one pound, which has cost you 2s. 6d. per lb., of which 6d. was for duty. Assume that the purchaser of the tea in India has to do with the remaining 2s. We have to account for his anxiety to know at what rate he could exchange silver for gold before he purchased the tea. Say that his position in India was 10 lbs. of tea for 10-96 rupees, or 1,808 grains of fine silver. He is going to sell the tea for gold in the British Isles, and he must ascertain how much fine gold embodied in pounds sterling are equal to 1,808 grains of fine silver. He finds that the rate of exchange is 21-88 pence per rupee, or 10-31 grains of fine gold for 165 grains of fine silver; so that his 10-96

rupees are worth £1, or 113·0016 grains of fine gold. On this exchange, by selling to you one pound of the tea at 2s. per lb. he makes nothing. But assume that exchange has altered in India, and has become 15·56 pence per rupee, or 165 grains of fine silver for 7·33 grains of fine gold, whilst the price of the tea in India has remained the same, viz., 1,808 grains of fine silver, or 10·96 rupees per 10 lbs. Under these conditions the cost price of the tea stands at 14s. 3d., or 80·36 grains of fine gold, and could be sold at a trifle more than 1s. 5d. per lb. The difference between 1s. 5d. and 2s. is 41 per cent. It is hardly necessary to state that the competition among producers, merchants of tea and others, would reduce profits to the ordinary level, and the consumer would get the immediate benefit of the reduced cost of the tea in the British Isles.*

When we examine into the cause of the diminished gold price of the tea, we do not find it to be the diminished cost of production or over-production of the tea, nor the diminished supply of gold and the consequent increased purchasing power of that metal in the British Isles: but we trace it distinctly and solely to the increased silver price of gold. The altered relation of silver to gold in the proportion of $15\frac{1}{2}$ to 16 parts of silver to 1 of gold in 1873, to $22\frac{1}{2}$ parts of silver to 1 of gold now, has not been produced by the gold but by the fact that silver can be obtained from the earth at vastly less cost value than in the proportion which formerly existed, when some ruins of the world were open to the unlimited reception of that metal at a fixed relation of $15\frac{1}{2}$ to 16 parts of silver to 1 part of gold. All the time these mints were open on these terms, the market price of silver was bound to be at the same relation, and marvellous profits were assured to silver miners.

MODES OF EFFECTING EXCHANGES.

The definition of a rate of exchange for business between two countries which possess effective metal standards may mean one of three things—I. The weight of fine metal forming the standard in one country, for a weight of fine metal form-

ing the standard in another country, resulting from the transmission of the metal. The metals may be gold for gold, silver for silver, gold for silver, or silver for gold. II. The weight of fine metal which has to be given in one country for a bill upon another country, which bill is a legal obligation to pay a definite weight of fine metal in that country. III. The weight of fine metal which could be obtained in one country by the sale of a bill upon another country, which bill is a legal obligation to pay a definite weight of fine metal in that country. The limitation to the fluctuation of exchange in the three cases would be the cost of carriage and coinage of the metal. Assume the following, a domestic case:—A person in London has funds in India which he desires to possess in London. There are three methods open to him whereby he could accomplish this—I. Order the rupees home and sell them in London. II. Have his silver invested in a bill on London for gold. III. Sell his bill in London for gold for his rupees in India. The best of the methods would depend upon whether India is indebted to the British Isles, or the British Isles are indebted to India, considered in connection with the probabilities of the future. The transmission of silver keeps the operation open until the sale of it, but this method is independent of the risk of a bill of exchange being dishonoured. This mode, however, owing to the uncertainty of the gold price of silver in the British Isles and the trouble connected with the business, would not be thought of unless the ordinary dealers in bills of exchange declined to buy bills in London upon India or to sell bills in India upon London. If India is receiving metal—her normal condition—the best mode would be by sale of a bill here for the silver in India. If India is sending silver to London, there would be little difference between selling a bill in London on India or buying a bill in India upon London.

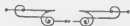
The normal state of the exchange between the British Isles and India necessitating the remittance of silver to the latter country, a closer investigation into the reasons for the rate for a bill of exchange in London on India being for so much, may be interesting and instructive. Take the market price of silver in London at the proportion of $22\frac{1}{2}$ parts of silver to 1 of gold, or 41·88 pence per standard ounce. The par of exchange between London and India at this price would be 15·56 pence per rupee. The par being 15·56 pence, why should a seller of a bill for rupees in London get a higher price than this? Because the bank or dealer in bills who is desirous to remit money to India would have to pay $2\frac{1}{2}$ per cent for coinage of his silver in India and $\frac{1}{2}$ of 1 per cent. for charges on the

* The testimony of traders with India in this country confirms this. It is also a direct necessary result upon the first principles of competition. Consider this collateral evidence. The gold price of Indian Government rupee securities has fallen 30 per cent. in the British Isles since 1873. There has been no such fall in India, nor has there been a rise in their silver price in the least corresponding with the rise in the silver price of gold. The cause of the decline in price in the British Isles is not the damaged credit of the Indian Government, the quantity of this class of securities, nor the diminished supply of gold, but the fall in the gold price of silver. The same motive actuates both the dealers in Indian commodities, such as cotton and wheat, and in Indian Government securities—namely, profit measured in grains of gold or grains of silver. Surely the same cause equally affects the gold prices of both classes of property.

transmission of it, in all 3 per cent. more if he was compelled to resort to the shipment of silver. A bill which gives him rupees in India causes him less trouble and suits him as well in other respects. So the seller of a bill obtains 1s. 4.15*d.* for a rupee. But if the state of India's indebtedness to the British Isles necessitates the shipment of silver, then upon the same gold price of silver the person desiring the equivalent of his rupees in London would obtain no more than 1s. 3.44*d.* because $\frac{1}{4}$ of 1 per cent., being charges on the transmission of the silver home, must be deducted.

The same laws would operate in connection with the exchanges of standard metal or metals between all countries of the world as those described in the exchange between the British Isles and India, and the object of the latter part of this paper is to bring them in a simple manner before your readers.

The world has no science of money. Not a day should be lost in preparing a science primer of money. I would that I could assist to stimulate the scientific men whose vision is not distorted by credit instruments, who possess an aptitude for the subject and could easily acquire "a masterly skill in bullion and coin," in my own country, in the United States of America, in Germany and in France, to accomplish this. Within ten years of the subject being taught with geography in the schools of the world and the issue of this primer, the utmost astonishment would be expressed at the present all but universal darkness which is over the subject and the gross errors which flourish therein.



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